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ABSTRACT

As mandated by the Michigan Department of Education (MDE), Schoolcraft Community College and the 12 high schools in its service district developed and implemented, in a three-phase project, an administrative agreement for formal articulation between secondary and college vocational education programs. The "Mobilization" phase involved: (1) securing the commitment of area school superintendents; (2) obtaining funding from the MDE; (3) forming an articulation council to develop the agreement; (4) conducting orientation sessions to promote the involvement of high school administrators and vocational education teachers. During the "Implementation" phase, curriculum materials, based on the major duties and specific job tasks in 11 occupational areas, were developed and field-tested. Job task lists, enumerating from the simplest to the most complex components of a job, were matched against skills taught at the high school and college levels. Additionally, official forms were developed to record students' progress in relation to this hierarchy of skills and to determine if college credit could be granted for high school courses. The "Institutionalization" phase involved the formal adoption of the articulation agreement and the provision for its governance by an administrative council. The report analyzes the benefits of the agreement and contains sample forms, the automechanics task list, and a copy of the articulation agreement. (JP)

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ARTICULATION WITH SECONDARY SCHOOLS --

VOCATIONAL/TECHNICAL EDUCATION

Presented by:

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PREFACE

Articulation Defined

"the total effort of educational groups and individuals to discover, establish, and continually improve relationships between policies, plans, procedures, programs, and people." (MDE)

Articulation refers to the relationships between educational programs which are designated to provide a smooth transition for students from one educational program to another. This movement of the student between programs can be either horizontal or vertical. Horizontal articulation includes those relationships between programs, courses or activities which exist at any one educational competency level and provide a coordinated educational program for the student. Vertical articulation refers to those relationships which exist between institutions' programs, courses or activities and provides a coordinated program for a student moving from one educational competency level to the next.

Articulation Process Prerequisite

The good-faith Articulation Process requires that all institutions engaged be "equal" partners. That is, each institution, regardless of number of buildings and/or size or level of education, is equal to another within the organized consortium. If the college is aiming for curriculum collaboration with an increase in student flow, it cannot "market" the process with an attitude of an authoritarian or "big brother" nature. Such an attitude would certainly be a barrier to the success of the articulation effort.

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INTRODUCTION

College Background

In 1961, the Schoolcraft Community College District was established to serve five local Districts: Clarenceville, Garden City, Livonia, Northville, and Plymouth. The College District area encompasses approximately one hundred twenty-five square miles, the northwest corner of Wayne County and portions of Oakland and Washtenaw Counties are included in this area. The District population is approximately three hundred thousand. Eleven high schools are operated by the K-12 Districts in which approximately 23,100 students are currently enrolled in grades 9 through 12.

In August, 1964, the first students were enrolled in Schoolcraft College. The college grew rapidly; paced by the housing boom in the District, enrollment of two thousand in 1964 increased to ten thousand in 1975. Today, approximately 75% of the students enrolled in traditional credit courses are in career programs, including Business and Public Service, the Health Sciences, and the Technologies.

History of Articulation Efforts at Schoolcraft College

During the early years of the College, individuals and a few departments established communication between the local Districts and the College in an attempt to develop guidelines for program articulation. These somewhat informal and infrequent contacts, however, did not become firmly enough established to become routine policy. Official attempts to create a model of Articulation did not fare any better until the

onset of the Competency-Based Education (CBE) Articulation Project (funded by the State) in September, 1977.

The need for articulation has been recognized since the birth of the College. "Cooperation in academic areas among the school districts has been a practice for a number of years in such areas as advanced courses in mathematics, science, and foreign languages. Cooperation between the local districts and the Community College is also evidenced by enrollment of specially referred high school students in selected college courses" (Schoolcraft Community College District Proposal, 1976).

For all the energy that has been expended on the subject of articulation, the results had been of limited value until the formal effort in September of 1977. This formal effort prescribed a "structure" with units of measurement of accomplishment, thus, allowing instructors/teachers to manage classrooms based upon joint curriculum decisions and criteria. Without such structure, each incoming Schoolcraft student could not be properly placed (without testing) according to his/her accomplished tasks performed at the secondary level.

Perhaps the lack of success of earlier years was due to the lack of unity of purposes among the local districts, as well as the lack of resources to attack the problem. It can be concluded, therefore, that a unified, well-organized, long-range effort which identifies components, procedures, and processes for vertical articulation is realistic when approached with commitment to cooperate and succeed; the present articulation effort is proof!

Articulation: The Need

Post-secondary education today has many challenges to face. It must accomodate on one end of the continuum a natural, yet desirable, diversity: diversity of student interest and capabilities along with a diversity of college priorities. On the other end, the post-secondary schools can be a singular community asset. When the

employers are pressed by the increasing need for specialized workers and employers are pressed by competition for jobs, these schools may be one of the best means for balancing needs at a low cost to the community.

However, post-secondary education, particularly that portion serviced under the vocational division, faces still another challenge within the continuum. While the Community College may fulfill the needs of the students and the community, it runs the risk of growing either too fast or in the wrong directions; thus, duplication or the lack of providing services in short supply becomes the result. It may even be found that growth is unable to take place at all because resources are currently used in existing programs. Therefore, the Community College when joined with others of its community's vocational educators can turn the challenges into mutual benefits toward effectiveness of the education offered.

"The articulation process between secondary and post-secondary vocational education programs is a critical issue to many individuals and agencies involved with the planning and evaluation of public vocational education" (National Advisory Council on Vocational Education, 1976). The planning and coordinating of programs between secondary schools and the Community College is necessary so that a student can progress from one level of training to the next higher level without experiencing unnecessary gaps or overlaps in a program of study. The Michigan Department of Education (MDE) in a 1975 report lists a wide range of conditions which indicate the need for new ways of thinking about, organizing, and conducting the educational enterprise in order to respond more effectively to learners. Some of these conditions are:

1. Duplication of learning experiences and overlapping curricula in high schools, area centers and college waste time and money and often fail to challenge young people.

2. Performance objectives are required for all occupational codes in Michigan. This required a different view of the function and relationship of educational sectors.
3. The increasing cost of education to students, parents and taxpayers makes improvement of articulation practices a necessity.
4. Development of secondary area centers and the changing role of community colleges and some four-year institutions have emphasized the need for improved articulation in Michigan.
5. Present facilities and delivery systems do not provide sufficient educational alternatives to students.
5. There is no mechanism which will provide a uniform effort by Department of Education Services to assure horizontal and vertical coordination and articulation among education agencies. (MDE Report, 1975)

Articulation: The Development of the Process

Curriculum agreement, administrative agreement, and the development of a student achievement recording process (SARP) typify the sequence suggested by the Michigan Department of Education in the process and model development of articulation. A desirable outcome would be effective implementation and long-term continuation. In fact, the positive outcomes anticipated from a more formalized articulation process hold so much promise that the Michigan Department of Education Vocational-Technical Education Service has included articulation as part of the Program Standards of Quality. These standards call for implementation of Articulated programs between secondary and post-secondary institutions by September of 1984.

The process, as exhibited within the Schoolcraft Consortium, is divided into three stages: Mobilization, Implementation, and Institutionalization. The following outline lists the specific efforts of the Schoolcraft College Consortium in order to innovate through Articulation in Vocational Education:

Articulation Process
Outline for Innovating

Mobilization

- I. Agreement within Consortium to "Articulate"
 - a. Secondary
 - b. Post-Secondary
- II. Understanding of the Articulation Process

Implementation

- III. Product Development
- IV. Field Testing

Institutionalization

- V. Formal Articulation
- VI. Adoption of Process
 - a. Administration
 - b. Admissions
 - c. Faculty/Counselors

ARTICULATION PROCESS: MOBILIZATION

Agreement within Consortium to "Articulate"

The agreement to "articulate" within the Schoolcraft consortium occurred when Schoolcraft College submitted a proposal for the development of an articulation model in vocational-technical educational programs within the College District. A "Letter of Intent" was secured from each superintendent of the Local Education Agencies (LEA's) to indicate commitment to the concept and product/process development. In September, 1977, the articulation process emerged. The goal being the development of an articulation system -- an "innovation" to provide a smooth, more continuous curriculum flow between education levels. The schedule was a three-year plan; the goals and objectives, along with the formation of an articulation council, were determined.

The project was funded through the Michigan Department of Education (MDE) Vocational-Technical Education Services with a local in-kind match; the MDE portion represented 75% of the total budget, and the local in-kind portion comprised the remaining 25%. The MDE portion was to decrease with each year so that institutionalization of the process and funding could occur. The funds, however, from the onset of the project were utilized totally; a full-time Director, secretarial assistance, stipends for faculty, classroom and office supplies, materials, mileage, in-service time, etc., were purchased.

Understanding of the Articulation Process

After an agreement to articulate is secured, an understanding of the articulation process is imperative for all faculty, counselors, and administrators directly related with vocational-technical education. Thus, the public relations and communication sector of the process begins on a large scale.

Orientation sessions for administrators and all vocational teachers within the twelve institutions (secondary and post-secondary) in the Schoolcraft Consortium were held in the early stage of the project. This established a basic contact and familiarized all necessary personnel with the Task Level Articulation process based on curriculum articulation and occupational task analysis.

During the orientation session each vocational educator could provide input as to the specific disciplines in need of articulation with which to begin. The first selections (based upon faculty and administrative input, post-secondary enrollment, and existing curriculum) were Automotive Mechanics, Child Care, Culinary Arts, Distributive Education, Drafting (Mechanical and Architectural) and Office Occupations. In later months, curriculum development for articulation began in Accounting, Electronics, Machine Trades, Nursing, and Welding. Thus, the procedures and/or processes mentioned in this paper may be designated and used in all discipline areas.

ARTICULATION PROCESS: IMPLEMENTATION

Product Development

Within the implementation stage of the process lies the actual product development; it is at this stage that the curriculum materials and competency records were developed. The faculty of all twelve schools were asked to participate, and a voluntary portion of the College District Faculty (Steering Committee) developed the materials and the entire College District Faculty within each discipline reviewed and revised the curriculum. The initial step in establishing the curriculum for an occupation into major duties (such as Engine Overhaul Activities for the Automotive Mechanic) and each duty into tasks (specific, meaningful units of work generally performed on the job by a worker). A task analysis was done in each occupational area and criteria for each task was developed along with both student and teacher directions (See Appendix A, Sample Task Package). Most of the task packages within the eleven discipline areas are performance-based; however, a cognitive test may be added as measurement for task criteria. Cognitive tests were added to the Child Care Discipline within the Schoolcraft Consortium.

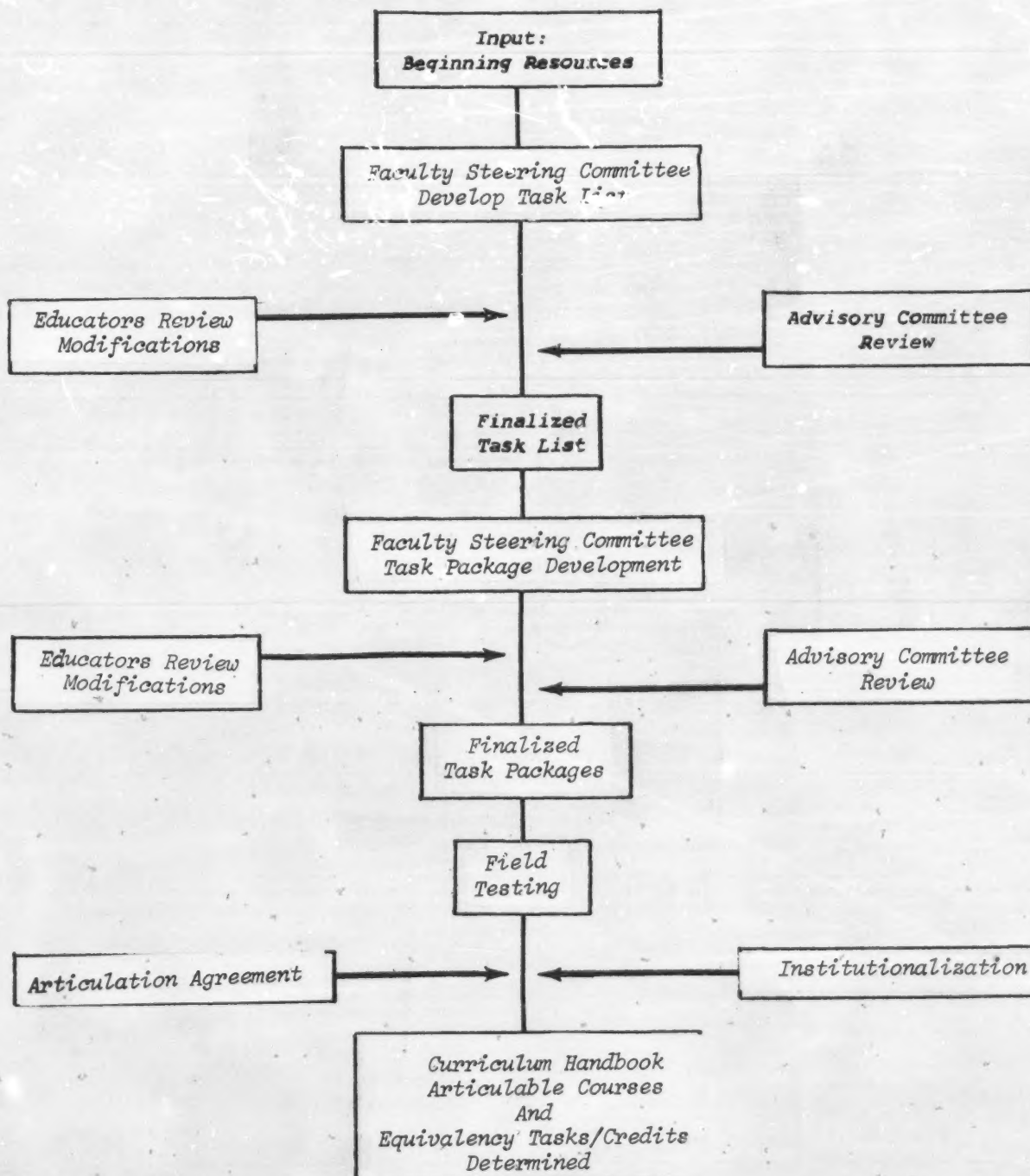
In addition, the necessary competency records were developed to record student progress. An official form called the "CR 79" was developed to become part of the vocational student's permanent record (See Appendix B), and an unofficial student record was developed so each vocational student could keep record throughout his/her entire secondary/post-secondary vocational program. (See Appendix C)

The chart on page nine details the curriculum development process.

Field Testing

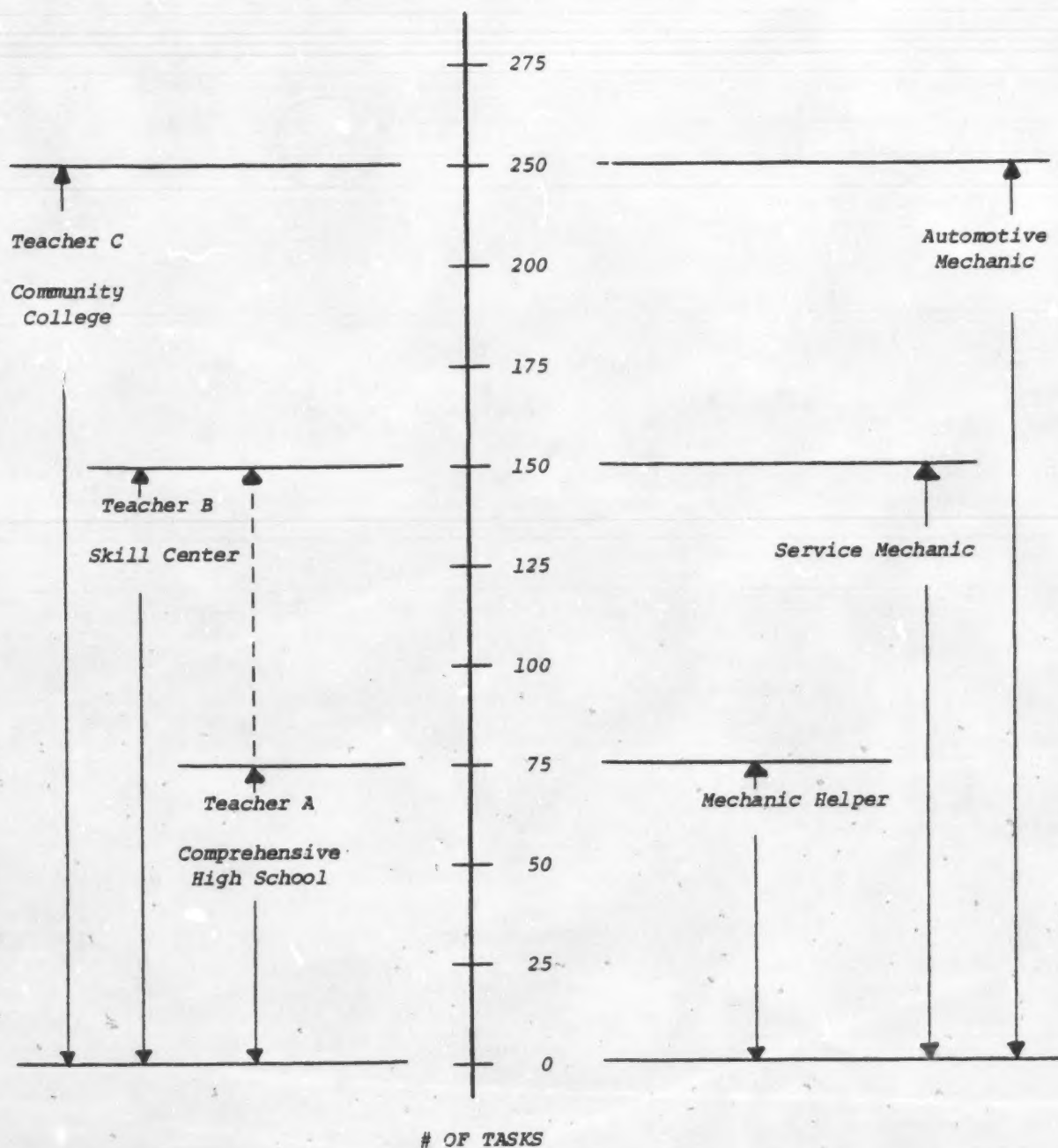
The field testing began after acceptance of a "final" product. The materials were actually used in the classroom so as to evaluate and modify if necessary. Each

The chart below details the curriculum development process.



discipline area faculty members met regularly to collaborate on articulation efforts, field testing, and the curriculum materials for "mutual adaption" at both levels of education. For example, the total automotive task list consists of 310 tasks representing secondary and post-secondary curriculum objectives. It was found that the teachers at the secondary level taught 137 of the 310 tasks. Later, this secondary list was interfaced with the tasks taught within the structure of the Schoolcraft College Automotive Mechanics coursework. It was designated that a possible 11 (eleven) credit hours could be articulated from the vocational courses at the secondary schools in the Schoolcraft Consortium Automotive Mechanics Discipline. This process has been followed for all articulated vocational areas.

The chart on page 11 details the "mutual adaption" of the curriculum and outlines "Task Level Articulation." An Auto Mechanics sample is used; however, the same pattern is followed within each discipline area. With this structure and curriculum collaboration, the gaps and overlaps within the educational process of a discipline are eliminated. Note that each course and educational level adds to the "task list" of the student with the Community College as the capstone. On the other hand, the Community College is also prepared to work with the student with no formal training and begin at task one; thus, whatever task competence is already experienced, the Community College "open door" swings.



CURRICULUM INTERFACING -- AUTOMOTIVE MECHANICS

ARTICULATION PROCESS: INSTITUTIONALIZATION

Formal Articulation

In order to institutionalize the process, a "formal" articulation agreement was prepared for the College District. The primary goal of the Administrative Agreement is to articulate vocational-technical students from the secondary level of education to the post-secondary level of education while giving college credit for competencies learned at the secondary level. The agreement was drafted by a selected committee within the District and revised by a committee of college staff selected by the College President (See Appendix D).

Today, the Articulation Agreements are signed for each of the five intermediate school districts and in-service sessions were held in each of the local high schools. As a result of the articulation efforts within the consortium, each vocational teacher at the secondary level will keep official competency records (Form CR-79) for each vocational student. This record will become part of the student's permanent record. Thus, the Articulation Agreement sparked the districts to institutionalize the process and aim for "full force" articulation.

Adoption of the Process

After each constituent district had signed the "formal agreement," a contact person was named; thus, six contact persons were selected as the "key" administrators of the process. These individuals, coupled with the executive committee of the Articulation Administrative Council and the Articulation Director, worked together to outline presentations, faculty/staff meetings, and other articulation activities.

Each constituent district within the College District, along with the college itself, has prescribed a "flow" for the articulation process. The important element

is that the CR-79 be available for each high school student to have transferred to the College upon applying.

When the College application is received along with the applicant's high school transcript and CR-79 form, Schoolcraft's Admissions Office is involved. The CR-79 form is reviewed, and college equivalency credit is determined. Afterwards, the student and counselor review and identify the student's placement level based on articulated courses. When the student enrolls in a discipline course program and completes ten credit hours, course credit based upon equivalency as determined will appear on the transcript. Thus, the "total" process is experienced.

SUMMARY

The Schoolcraft College District with a formal articulation agreement has fulfilled the guidelines set in the Program Standards of Quality for the State of Michigan. This fulfillment is, however, only a fraction of the innumerable benefits experienced from the implementation and institutionalization of the concept of "articulation"; faculty, counselors, students, staff, and the community all gain as a result. Many of the gains are fringe benefits or "side effects" to the project plans -- increased faculty-to-faculty relationships (both secondary to post-secondary and secondary to other secondary, inter-district), inspired individuals to appreciate the "expertise" of one another, provided professional growth and development, enhanced public relations, developed an introspection into vocational education, etc.

In addition to the "side effects" of the process, certain planned, expected benefits are gained through implementing --

- Instruction and evaluation methodologies are improved
- Program content is validated
- Student motivation is enhanced
- Student flow from secondary to post-secondary schools is intensified.
- Duplication of courses and/or tasks is eliminated
- Voids within a discipline are eliminated
- Tax dollars are more effectively applied

Penetrating still deeper than the institutions rewards are the benefits to faculty and students. The process of articulation itself is accommodated through faculty working together to establish a common curriculum on a continuum from simple to technical. Through this process students may step off of the educational ladder to accept work opportunities and step back on the ladder and continue their educational advancement without experiencing loss of time, credit, and resources.

Faculty are provided:

- Assistance in organizing and managing curriculum
- A means to evaluate and record student progress
- The opportunity to share resources in providing quality vocational programs

Students are able to:

- Work toward Schoolcraft College equivalency credit while still in high school
- Progress from secondary centers and schools to Schoolcraft College with a smooth, continuous curriculum transition and minimum repetition
- Identify those tasks in which they need to develop competence to complete certification/graduation requirements
- Choose from a range of alternatives on a given career ladder
- Develop job entry skills at a level acceptable to the world of work
- Use their "Competency Record" as a resume when applying for employment
- Save time, money, and effort

Surely, during the articulation activities an element of trust was built among the educators involved, only to bring the end result of "benefit to students." Moreover, the Consortium looks to continued Articulation efforts as we "keep up" with technology in the vocational-technical area as well as the education thereof.

DUTY:



TASK:

TASK CRITERIA:

Competence in the task will be recognized when the student satisfactorily performs the following:

DIRECTIONS TO THE STUDENT:

STUDENT RESPONSE:

DUTY:



TASK:

DIRECTIONS TO THE EVALUATOR:

EVALUATOR'S RESPONSE:

Satisfactory performance is indicated when all checks are "yes."

If the student performance was not satisfactory, cite below any significant reasons.

If the student performance was exemplary, indicate this.

_____ PASS

_____ NO PASS

FORM CR79

ARTICULATION COMPETENCY RECORD

Schoolcraft College District

NAME OF SCHOOL _____

ADDRESS _____

TELEPHONE _____

STUDENT ID NO. _____

COUNSELOR _____

NAME OF PROGRAM _____

OE CODE # _____

EXPECTED YEAR OF GRADUATION _____

COMPLETED PROGRAM? ☐ YES ☐ NO

NAME OF STUDENT _____

Last

First

Middle

ADDRESS _____

City

State

Zip

HOME PHONE NO. _____

SEX: ☐ M ☐ F

BIRTHDATE _____

SOCIAL SECURITY NO. _____

DIRECTIONS The Competency Record tells what has been demonstrated. Check (☒) only those competencies (tasks) successfully completed by the above named student.
DO NOT record unsuccessful attempts. (See reverse side for task checklist.)

COMMENTS _____

TEACHER SIGNATURE	COURSE	YEAR
1		
2.		
3.		
4. 22		25

NAME OF STUDENT _____

PROGRAM AREA _____

A	44 O	19 O	36 O	18 O	8 O	15 O	59 O	J	12 O	17 O	3 O	35 O	10 O
1 O	45 O	20 O	37 O	19 O	9 O	16 O	60 O	1 O	13 O	18 O	4 O	S	11 O
2 O		21 O	38 O	20 O	10 O	17 O		2 O	14 O	19 O	5 O		12 O
3 O	B	22 O	39 O	21 O	11 O	18 O		3 O	15 O	20 O	6 O	1 O	13 O
4 O	1 O	23 O	40 O	22 O	12 O	19 O	1 O	4 O	16 O		7 O	2 O	14 O
5 O	2 O	24 O	41 O	23 O	13 O	20 O	2 O	5 O	17 O	N	8 O	3 O	15 O
6 O	3 O	25 O	42 O	24 O	14 O	21 O	3 O	6 O	18 O	1 O	9 O	4 O	
7 O	4 O		43 O	25 O	15 O	22 O	4 O	7 O	19 O	2 O	10 O	5 O	U
8 O	5 O	D	44 O	26 O	16 O	23 O	5 O	8 O	20 O	3 O		6 O	1 O
9 O	6 O	1 O	45 O	27 O	17 O	24 O	6 O	9 O	21 O	4 O	R	7 O	2 O
10 O	7 O	2 O	46 O	28 O	18 O	25 O	7 O	10 O	22 O	5 O	1 O	8 O	3 O
11 O	8 O	3 O	47 O	29 O	19 O	26 O	8 O	11 O	23 O	6 O	2 O	9 O	4 O
12 O	9 O	4 O	48 O	30 O	20 O	27 O	9 O	12 O	24 O	7 O	3 O	10 O	5 O
13 O	10 O	5 O	49 O		21 O	28 O	10 O	13 O	25 O	8 O	4 O	11 O	6 O
14 O	11 O	6 O	50 O	F	22 O	29 O	11 O	14 O		9 O	5 O	12 O	7 O
15 O	12 O	7 O	51 O	1 O	23 O	30 O	12 O	15 O	L	10 O	6 O	13 O	8 O
16 O	13 O	8 O	52 O	2 O	24 O	31 O	13 O	16 O	1 O		7 O	14 O	9 O
17 O	14 O	9 O	53 O	3 O	25 O	32 O	14 O	17 O	2 O	O	8 O	15 O	10 O
18 O	15 O	10 O	54 O	4 O	26 O	33 O	15 O	18 O	3 O	1 O	9 O	16 O	
19 O	16 O	11 O	55 O	5 O	27 O	34 O	16 O	19 O	4 O	2 O	10 O	17 O	OTHER
20 O	17 O	12 O	56 O	6 O	28 O	35 O	17 O	20 O	5 O	3 O	11 O	18 O	
21 O	18 O	13 O	57 O	7 O	29 O	36 O	18 O	21 O	6 O	4 O	12 O	19 O	
22 O	19 O	14 O	58 O	8 O	30 O	37 O	19 O	22 O	7 O	5 O	13 O	20 O	
23 O	20 O	15 O	59 O	9 O	31 O	38 O	20 O	23 O	8 O	6 O	14 O	21 O	
24 O		16 O	60 O	10 O	32 O	39 O	21 O	24 O	9 O	7 O	15 O	22 O	
25 O	C	17 O		11 O	33 O	40 O	22 O	25 O	10 O	8 O	16 O	23 O	
26 O	1 O	18 O		12 O	34 O	41 O	23 O	26 O		9 O	17 O	24 O	
27 O	2 O	19 O	E	13 O	35 O	42 O	24 O	27 O	M	10 O	18 O	25 O	
28 O	3 O	20 O	1 O	14 O		43 O	25 O	28 O	1 O		19 O	26 O	
29 O	4 O	21 O	2 O	15 O	H	44 O	26 O	29 O	2 O	P	20 O	27 O	
30 O	5 O	22 O	3 O	16 O	1 O	45 O	27 O	30 O	3 O	1 O	21 O	28 O	
31 O	6 O	23 O	4 O	17 O	2 O	46 O	28 O		4 O	2 O	22 O	29 O	
32 O	7 O	24 O	5 O	18 O	3 O	47 O	29 O	K	5 O	3 O	23 O	30 O	
33 O	8 O	25 O	6 O	19 O	4 O	48 O	30 O	1 O	6 O	4 O	24 O		
34 O	9 O	26 O	7 O	20 O	5 O	49 O	31 O	2 O	7 O	5 O	25 O	T	
35 O	10 O	27 O	8 O		6 O	50 O	32 O	3 O	8 O	6 O	26 O	1 O	
36 O	11 O	28 O	9 O	G	7 O	51 O	33 O	4 O	9 O	7 O	27 O	2 O	
37 O	12 O	29 O	10 O	1 O	8 O	52 O	34 O	5 O	10 O	8 O	28 O	3 O	
38 O	13 O	30 O	11 O	2 O	9 O	53 O	35 O	6 O	11 O	9 O	29 O	4 O	
39 O	14 O	31 O	12 O	3 O	10 O	54 O	36 O	7 O	12 O	10 O	30 O	5 O	
40 O	15 O	32 O	13 O	4 O	11 O	55 O	37 O	8 O	13 O		31 O	6 O	
41 O	16 O	33 O	14 O	5 O	12 O	56 O	38 O	9 O	14 O	Q	32 O	7 O	
42 O	17 O	34 O	15 O	6 O	13 O	57 O	39 O	10 O	15 O	1 O	33 O	8 O	
43 O	18 O	35 O	16 O	7 O	14 O	58 O	40 O	11 O	16 O	2 O	34 O	9 O	

Competency Record

AUTOMECHANICS

NAME _____

SCHOOL _____

Schoolcraft Community College District Articulation Project

The competence record tells what has been demonstrated.

Grading: + = Exemplary performance on task. (Demonstrated task and met suggested criteria well above expected response within 125% of flat rate.)

✓ = Satisfactory performance on task. (Achieved 100% on test/performance of suggested task criteria.)

A = Attempted performance on task. (Made an unsuccessful effort to fulfill the suggested task criteria.)

	Secondary			Post Secondary		
	Grade	Date	Teacher	Grade	Date	Teacher
DUTY: PERFORMING ENGINE OVERHAUL ACTIVITIES						
A-1 Clean an engine.						
A-2 Replace engine mounts.						
A-3 Remove engine with transmission from vehicle.						
A-4 Install engine with transmission.						
A-5 Disassemble engine with transmission.						
A-6 Clean engine parts and check for conditions.						
A-7 Replace oil pan gaskets.						
A-8 Replace seals and gaskets.						
A-9 Replace oil pump.						
A-10 Remove and install camshaft.						
A-11 Replace camshaft bearings.						
A-12 Replace crankshaft main bearings.						
A-13 Remove, inspect and install crankshaft.						
A-14 Perform operational inspections to test engine lubrication system.						
A-15 Remove and install (press fit) piston pin.						
A-16 Remove and install connecting rod and piston assemblies.						
A-17 Remove and install piston rings.						
A-18 Replace connecting rod bearings.						
A-19 Check cylinder head warpage.						
A-20 Remove valves.						
A-21 Reface valve seats.						
A-22 Reface valves.						
A-23 Reaming valve guides.						
A-24 Install valves.						
A-25 Valve adjustment.						
A-26 Replace exhaust manifold gasket(s).						
A-27 Replace flywheel ring gear.						
A-28 Replace flywheel and flywheel ring gear.						

	Secondary			Post Secondary		
	Grade	Date	Teacher	Grade	Date	Teacher
DUTY: PERFORMING ENGINE OVERHAUL ACTIVITIES (Continued)						
A-29						
A-30						
A-31						
A-32						
A-33						
A-34						
A-35						
A-36						
A-37						
A-38						
A-39						
A-40						
DUTY: MAINTAINING AND REPAIRING COOLING SYSTEMS						
B-1						
B-2						
B-3						
B-4						
B-5						
B-6						
B-7						
B-8						
B-9						
B-10						
B-11						
B-12						
B-13						
B-14						
B-15						
B-16						
DUTY: MAINTAINING AND REPAIRING FUEL SYSTEMS						
C-1						
C-2						
C-3						
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C-16						
C-17						

		Secondary			Post Secondary		
		Grade	Date	Teacher	Grade	Date	Teacher
DUTY:	MAINTAINING AND REPAIRING FUEL SYSTEMS (cont)						
C-18	Fuel injection, inspect and adjust as necessary.						
C-19	Service turbo charger.						
DUTY:	MAINTAINING AND REPAIRING AUTOMATIC TRANSMISSIONS						
D-1	Perform operational test on automatic transmission						
D-2	Clean and visually inspect transmission.						
D-3	Adjust floor linkage.						
D-4	Adjust column-type transmission linkage.						
D-5	Adjust linkage from engine to automatic transmission.						
D-6	Adjust modulator.						
D-7	Replace and adjust modulator.						
D-8	Adjust neutral safety switch.						
D-9	Replace neutral safety switch.						
D-10	Service the transmission filter.						
D-11	Make band adjustments (internal or external).						
D-12	Replace external seals, gaskets, and lines on automatic transmission.						
D-13	Inspect and repair transmission cooling system.						
D-14	Replace automatic transmission cooler (external type).						
D-15	Replace automatic transmissions.						
D-16	Replace torque converter.						
D-17	Replace front pump, seal, and bushings.						
D-18	Overhaul automatic transmission.						
DUTY:	MAINTAINING AND REPAIRING POWER TRAINS						
E-1	Adjust clutch linkage.						
E-2	Replace clutch release bearings (throw-out bearings).						
E-3	Replace mechanical-type clutch.						
E-4	Replace pilot bearing.						
E-5	Repair hydraulic-type clutch.						
E-6	Inspect drive shaft, U-joints, and center bearings.						
E-7	Lubricate universal joints.						
E-8	Replace universal joints.						
E-9	Test manual transmission operation.						
E-10	Replace transmission mounts.						
E-11	Adjust external shift linkage on manual transmission.						
E-12	Replace manual transmission real seal, gasket, and bushing.						
E-13	Replace manual transmission.						
E-14	Rebuild manual transmission.						
E-15	Analyze and repair electrical control circuit and components for overdrive unit.						
E-16	Lubricate speedometer cable and housing.						
E-17	Replace speedometer cable and housing.						
E-18	Replace speedometer drive gear.						
E-19	Repair and adjust front drive axle assembly.						
E-20	Diagnose differential malfunctions.						
E-21	Replace pinion seal.						
E-22	Replace real axle shaft, bearing, and seal.						
E-23	Repair or replace differential.						
E-24	Repair four wheel drive hubs and transfer cases.						

	Secondary			Post Secondary		
	Grade	Date	Teacher	Grade	Date	Teacher
DUTY: MAINTAINING AND REPAIRING STANDARD AND POWER STEERING UNITS						
F-1						
F-2						
F-3						
F-4						
F-5						
F-6						
F-7						
F-8						
F-9						
F-10						
F-11						
F-12						
F-13						
F-14						
F-15						
F-16						
DUTY: MAINTAINING AND REPAIRING SUSPENSION SYSTEMS						
C-1						
C-2						
C-3						
C-4						
C-5						
C-6						
C-7						
C-8						
C-9						
C-10						
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C-30						

		Secondary			Post Secondary		
		Grade	Date	Teacher	Grade	Date	Teacher
DUTY: MAINTAINING AND REPAIRING BRAKING SYSTEMS							
H-1	Perform operational brake inspection.						
H-2	Adjust brakes.						
H-3	Inspect and refinish brake drums.						
H-4	Replace brake shoes.						
H-5	Inspect and replace self-adjusters.						
H-6	Repair self-adjusters.						
H-7	Rebuild wheel cylinder.						
H-8	Replace wheel cylinder.						
H-9	Repair master cylinder.						
H-10	Replace master cylinder.						
H-11	Replace hydraulic control valves.						
H-12	Replace hydraulic power cylinder.						
H-13	Bleed hydraulic brakes.						
H-14	Free-up parking brake cables.						
H-15	Adjust parking brake linkage.						
H-16	Replace parking brake linkage.						
H-17	Inspect and replace brake pads (disc brakes).						
H-18	Inspect and turn rotor (disc brakes).						
H-19	Repair disc brake caliper.						
H-20	Replace hydraulic brake power unit.						
H-21	Service backing plates.						
DUTY: MAINTAINING AND REPAIRING ELECTRICAL SYSTEMS							
I-1	Inspect and test ignition switch, resistor, wiring, and coil of the primary circuit.						
I-2	Set ignition timing.						
I-3	Replace ignition coil of the primary circuit.						
I-4	Replace ignition switch and resistor of the primary resistor.						
I-5	Inspect secondary circuit lead wires, distributor cap, and rotor and measure resistance in secondary wires.						
I-6	Inspect and replace distributor cap, rotor, and points.						
I-7	Inspect contact points and condenser of the primary circuit.						
I-8	Replace ignition points and condenser.						
I-9	Gap and test spark plugs.						
I-10	Overhaul and calibrate distributor.						
I-11	Strobe distributor and modify or correct advance curves.						
I-12	Test and repair electronic ignition systems.						
I-13	Analyse and adjust engine, using engine analyzer.						
I-14	Replace and adjust distributor.						
I-15	Evaluate alternator or generator and regulator output.						
I-16	Replace generator or alternator.						
I-17	Repair generator or alternator.						
I-18	Repair or replace charging system regulator.						
I-19	Service or replace, and test batteries, cables, and battery box.						
I-20	Replace and test starter.						
I-21	Replace solenoid.						
I-22	Analyse malfunctions in the cranking system.						
I-23	Repair starter.						
I-24	Perform operational inspection of lighting system.						
I-25	Adjust headlights.						

	Secondary			Post Secondary		
	Grade	Date	Teacher	Grade	Date	Teacher
DUTY: MAINTAINING AND REPAIRING ELECTRICAL SYSTEMS (Continued)						
I-26	Adjust backup light switch.					
I-27	Repair or replace lighting system components.					
I-28	Repair or replace switches.					
I-29	Replace flasher unit.					
I-30	Repair or replace fuse block assembly.					
I-31	Test and rewire dash unit.					
I-32	Locate and repair short or open circuit in wiring.					
I-33	Replace chassis and underhood wiring.					
I-34	Inspect and test windshield wiper motor, blades, and arms.					
I-35	Repair windshield wiper mechanisms and controls.					
I-36	Test and repair cruise control unit.					
DUTY: MAINTAINING AND REPAIRING AUTOMOBILE AIR CONDITIONERS AND HEATERS						
J-1	Pressure test air conditioner.					
J-2	Leak test system.					
J-3	Diagnose air conditioning malfunctions.					
J-4	Inspect and recharge system with refrigerant.					
J-5	Replace receiver filter drier in air conditioning unit.					
J-6	Replace air conditioning compressor.					
J-7	Replace compressor seal and o-rings.					
J-8	Repair air conditioning compressor.					
J-9	Replace condenser in air conditioning unit.					
J-10	Replace evaporator in air conditioning unit.					
J-11	Replace expansion valve in air conditioning unit.					
J-12	Replace evaporator control valve or diaphragm in air conditioning unit.					
J-13	Repair vacuum circuit.					
J-14	Repair electrical circuit.					
J-15	Replace air conditioner fan motor.					
J-16	Service air conditioner control cables.					
J-17	Install air conditioner.					
J-18	Repair automatic air conditioning and heating system.					
J-19	Diagnose heating system malfunctions.					
J-20	Replace defroster hose.					
J-21	Replace heater control unit.					
J-22	Replace heater core.					
J-23	Repair heater core.					
J-24	Service heater control components.					
DUTY: MINOR REPAIR SERVICES						
K-1	Check and adjust automatic transmission fluid level.					
K-2	Replace coil secondary cable.					
K-3	Replace spark plugs.					
K-4	Inspect, test, and charge or replace batteries.					
K-5	Inspect and replace battery cables.					
K-6	Clean and/or replace battery cable ends.					
K-7	Inspect and repair battery hold down.					
K-8	Replace flashers and fuses.					
K-9	Replace headlamps.					

	Secondary			Post Secondary		
	Grade	Date	Teacher	Grade	Date	Teacher
DUTY: MINOR REPAIR SERVICES (Continued)						
K-10	Adjust headlights					
K-11	Repair or replace lighting system components					
K-12	Repair windshield washer system					
K-13	Replace or repair heat control valve					
K-14	Inspect the exhaust system					
K-15	Change engine oil					
K-16	Replace engine oil filter					
K-17	Replace oil pressure sending unit					
K-18	Replace temperature sending unit					
K-19	Inspect for tire wear and damage					
K-20	Mount tires					
K-21	Rotate tires					
K-22	Replace exhaust pipe					
DUTY: IDENTIFICATION OF FASTENERS (ORIENTATION)						
L-1	Identify threads (SAE, USS)					
L-2	Identify bolt grades and torques					
L-3	Identify metric fasteners					
DUTY: USE OF SHOP EQUIPMENT (ORIENTATION)						
M-1	Operate hoists					
M-2	Operate jacks and stands					
M-3	Operate pneumatic tools					
M-4	Operate press					
M-5	Operate tire changer (air operated)					
M-6	Operate on-the-car balancer (Hunter type)					
M-7	Operate disk brake lathe					
M-8	Operate drum brake lathe					
M-9	Operate battery charger					
M-10	Operate gas welder (set-up, heating and cutting -- safety)					
M-11	Operate bench grinder					
M-12	Operate drill press					
DUTY: USE OF MEASURING TOOLS (ORIENTATION)						
N-1	Operate machinist rule					
N-2	Operate feeler gauge (wire and flat)					
N-3	Operate micrometers (inside and outside)					
N-4	Operate vernier calipers					
N-5	Operate dial indicators					
N-6	Operate plastic gauge					
N-7	Operate telescoping gauge					
N-8	Operate small hole gauges					

	Secondary			Post Secondary		
	Grade	Date	Teacher	Grade	Date	Teacher
DUTY: DRILLING, THREADING, AND EXTRACTIONS (ORIENTATION)						
O-1 Identify drill types and sizes						
O-2 Operate hole saws, circle cutters and hole punches						
O-3 Remove damaged fasteners (screw extractors)						
O-4 Tap a hole						
O-5 Thread a rod						
O-6 Restore threads (helicoil inserts)						
DUTY: TUBING REPAIR (ORIENTATION)						
P-1 Operate tubing cutter						
P-2 Double flare tubing						
P-3 Bend tubing						
DUTY: ELECTRICAL CONNECTIONS (ORIENTATION)						
Q-1 Identify type of connectors						
Q-2 Solder a wire connection						
DUTY: TOOLS (ORIENTATION)						
R-1 Identify basic handtools						
R-2 Identify special tools						
R-3 Operate torque wrenches						
R-4 Identify possible sources of tool purchase						
DUTY: SHOP SAFETY (ORIENTATION)						
S-1 Identify basic first aid procedures for cuts, burns, shock and eye injuries						
S-2 Identify procedure for obtaining emergency medical treatment						
S-3 Identify shop safety equipment						
S-4 Identify procedure for lifting heavy objects						
S-5 Identify proper wearing apparel						
S-6 Identify required eye protection						
S-7 Identify proper shop conduct						
S-8 Identify proper vehicle operation in shop area						
S-9 Identify proper methods and materials for cleaning parts						
S-10 Identify proper procedures for handling and storage of combustible materials						
S-11 Identify proper procedures for handling and storage of caustic materials						
S-12 Identify safety precautions required when working with batteries						
S-13 Identify safety precautions required when working on the air conditioning system						
S-14 Identify operation of shop vent system						
S-15 Identify automobile hazard areas						
S-16 Identify safe operation and care of hand tools						
S-17 Identify safe operation of electrical equipment						
S-18 Identify housekeeping procedures required for shop safety						

	<u>Secondary</u>			<u>Post Secondary</u>		
	Grade	Date	Teacher	Grade	Date	Teacher
DUTY: REFERENCE MATERIALS (ORIENTATION)						
T-1 Identify specifications and procedures using manufacturer's service manuals						
T-2 Identify specifications and procedures using a comprehensive service manual such as Motor, Mitchell, Chilton or Glenn						
T-3 Identify parts and labor charges using a comprehensive flat rate manual such as Motor, Mitchell, Chilton or Glenn						
T-4 Prepare a work order						

OTHER:

COMMENTS:

SCHOOLCRAFT COMMUNITY COLLEGE DISTRICT
SECONDARY/POST-SECONDARY ARTICULATION AGREEMENT

Statement of Intent

The purpose of this Articulation Agreement is to provide a mechanism which will enable vocational-technical programs at the secondary and post-secondary level of education to interface in order to grant equivalency college credit to students for identified task competencies achieved in secondary programs.

Participating Institutions

We, the undersigned representatives of the listed institutions, agree to the terms of this Articulation Agreement for a period of three (3) academic years after the date of signing.

Discipline Areas

Accounting
 Architectural Technology
 Auto Mechanics
 Child Care
 Culinary Arts
 Electronics

Machine Trades
 Mechanical Drafting
 Nursing
 Office Occupations
 Welding

Post-Secondary Institution

Schoolcraft College

Secondary Institution

Date _____

Authorized Agents

 President

 Contact Person

 Title

 Superintendent

 Contact Person

 Title

ARTICLES OF AGREEMENT

Conditions

1. Each articulating student must be fully matriculated and provide Schoolcraft College with a copy of his/her competency record in his/her intended program of study.
2. Participating teachers at the secondary school will maintain a competency record for each student which identifies areas and levels of task achievement. This record will become part of the student's permanent record and will be forwarded to Schoolcraft College upon request by the student.
3. Articulation Agreement Review and Change:
 - 3.1 On or before April 1 of each academic year a meeting will be scheduled for each occupational area in order to review occupational tasks and criterion tests used to measure levels of competency. All teachers of secondary and post-secondary occupational programs will be invited to provide input for review and revision of the tasks and tests.
 - 3.2 On or before May 1 of each academic year, a review of the articulation agreement and process will be conducted by a review committee. The review committee (representing each occupational area) will be determined by the chief executive officers.
4. Secondary teachers in the aforementioned disciplines will teach from a minimum set of task competencies as agreed upon. Evidence of achievement of this will be exhibited by the appropriate monitoring and certification of students in secondary programs.
5. All new full-time faculty and administrators directly involved in the Schoolcraft Community College District Articulation Agreement will be in-serviced in CBE and oriented to the articulation process.
6. Students must complete 10 (ten) credit hours in the intended program area with a minimum GPA of 2.0 in order to receive articulation credit.

Benefits

1. Students will receive Schoolcraft College equivalency credit for courses which they have demonstrated competencies for the identified tasks.
2. As in any other advanced placement, no tuition and fees for courses articulated will be charged.
3. Equivalency credit for articulated courses will appear on the transcript of Schoolcraft College by course title and credit hours.